

What is claimed is:

1. A method for reading a radiation image from a stimuable phosphor sheet comprising a transparent substrate and a stimuable phosphor layer containing therein a latent radiation image by means of a radiation image-reading means comprising a stimulating light-applying unit and a stimulated emission-collecting unit comprising a lens and a stimulated emission-receiving plane, which  
5 comprises the steps of applying a stimulating light onto the stimuable phosphor layer under the condition that the stimuable phosphor sheet moves along a sheet plane thereof in relation to the stimulated emission-collecting unit; collecting a stimulated emission emitting from the  
10 area onto which the stimulating light is applied on the stimulated emission-receiving plane through the transparent substrate and lens; and photoelectrically converting the collected emission into electric signals in the stimulated emission-collecting unit, wherein the stimuable  
15 phosphor sheet moves in relation to the stimulated emission-collecting unit under the condition that the stimulating light-applied area of the stimuable phosphor layer is kept apart from the center of the stimulated emission-receiving plane with a space in the range defined by a combination of a reference space and a focal  
20 depth of the lens, the reference space being defined by a  
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length at which the stimulated emission emitting from the stimuable phosphor layer focuses on the stimulated emission-receiving plane after passing through the transparent substrate and lens.

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2. The method of claim 1, wherein the stimuable phosphor sheet has a reference plane area on both side surfaces of the transparent substrate on the side of the stimuable phosphor layer and the stimuable phosphor  
10 sheet is moved under the condition that the phosphor sheet is supported at the reference plane areas on a supporting means which is arranged in a position fixed in relation to the stimulated emission-collecting unit.

15 3. The method of claim 1, wherein the stimuable phosphor sheet has a reference plane area on both side surfaces of the transparent substrate on the side of the stimuable phosphor layer, the stimuable phosphor sheet is supported at the reference plane areas on a supporting  
20 means, and the stimulated emission-collecting unit is moved on the supporting means.

4. The method of claim 2, wherein the reference plane area of the transparent substrate has on a surface

thereof irregularities within  $\pm 100 \mu\text{m}$  in terms of a mean irregularity height.

5        5.    The method of claim 1, wherein the transparent substrate is a rigid transparent substrate.

6.    The method of claim 5, wherein the rigid transparent substrate is a glass sheet.

10       7.    The method of claim 1, wherein the stimuable phosphor layer has a stimulated emission-reflecting layer on the side not facing the substrate.

15       8.    The method of claim 1, wherein the stimuable phosphor layer is produced by a gas phase deposition method.

20       9.    The method of claim 1, wherein the stimulating light-applying unit and stimulated emission-collecting unit of the radiation image-reading means are arranged on the side facing the transparent substrate of the stimuable phosphor sheet.

10. A radiation image reading apparatus for performing the method of claim 2, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the radiation  
5 image-reading means and allows movement of the stimuable phosphor sheet along the sheet plane by supporting the stimuable phosphor sheet at the reference plane areas, and a driving means for driving the movement of the stimuable phosphor sheet.

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11. A radiation image reading apparatus for performing the method of claim 3, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the stim-  
15 able phosphor sheet and allows movement of the radiation image-reading means, and a driving means for driving the movement of the radiation image-reading means.

12. A method for reading a radiation image from a  
20 stimuable phosphor sheet comprising a substrate and a stimuable phosphor layer containing therein a latent radiation image by means of a radiation image-reading means comprising a stimulating light-applying unit and a stimulated emission-collecting unit comprising a lens and  
25 a stimulated emission-receiving plane, which comprises the steps of applying a stimulating light onto the

stimulable phosphor layer under the condition that the  
stimulable phosphor sheet moves along a sheet plane  
thereof in relation to the stimulated emission-collecting  
unit; collecting a stimulated emission emitting from the  
5 area onto which the stimulating light is applied on the  
stimulated emission-receiving plane through not the sub-  
strate but the lens; and photoelectrically converting the  
collected emission into electric signals in the stimulat-  
ed emission-collecting unit, wherein the stimulable phos-  
10 phor sheet moves in relation to the stimulated emission-  
collecting unit under the condition that the stimulating  
light-applied area of the stimulable phosphor layer is  
kept apart from the center of the stimulated emission-  
receiving plane with a space in the range defined by a  
15 combination of a reference space and a focal depth of the  
lens, the reference space being defined by a length at  
which the stimulated emission emitting from the stimul-  
able phosphor layer focuses on the stimulated emission-  
receiving plane after passing through the lens.

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13. The method of claim 12, wherein the stimulable  
phosphor sheet has a reference plane area on both side  
surfaces of the substrate on the side of the stimulable  
phosphor layer and the stimulable phosphor sheet is moved  
25 under the condition that the phosphor sheet is supported  
at the reference plane areas on a supporting means which

is arranged in a position fixed in relation to the stimulated emission-collecting unit.

14. The method of claim 12, wherein the stimu-  
5 phosphor sheet has a reference plane area on both side  
surfaces of the substrate on the side of the stimu-  
phosphor layer, the stimu- phosphor sheet is support-  
ed on a supporting means, and the stimulated emission-  
collecting unit is moved on the reference plane areas of  
10 the stimu- phosphor sheet.

15. The method of claim 14, wherein the stimu-  
phosphor sheet has on a surface of the stimu- phos-  
phor layer irregularities within  $\pm 50 \mu\text{m}$  in terms of a  
15 mean irregularity height.

16. The method of claim 12, wherein the substrate  
is a rigid substrate.

20 17. The method of claim 16, wherein the rigid sub-  
strate is made of material having a modulus of elasticity  
of  $1 \times 10^5 \text{ kgf/cm}^2$  or higher and a thickness in the range  
of  $200 \mu\text{m}$  to 10 mm.

18. The method of claim 12, wherein the stimuable phosphor layer is produced by a gas phase deposition method.

5        19. The method of claim 12, wherein the stimulating light-applying unit and stimulated emission-collecting unit of the radiation image-reading means are arranged on the side facing the stimuable phosphor layer of the stimuable phosphor sheet.

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20. A radiation image reading apparatus for performing the method of claim 13, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the radiation  
15 image-reading means and allows movement of the stimuable phosphor sheet along the sheet plane by supporting the stimuable phosphor sheet at the reference plane areas, and a driving means for driving the movement of the stimuable phosphor sheet.

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21. A radiation image reading apparatus for performing the method of claim 14, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the stim-  
25 able phosphor sheet, and a driving means for driving the

movement of the radiation image-reading means on the reference plane areas of the stimuable phosphor sheet.

22. A stimuable phosphor sheet comprising a rigid  
5 substrate, a stimuable phosphor layer having irregularities on a surface thereof, and a reference plane-forming guide means attached to the rigid substrate on both side surfaces thereof, the reference plane-forming means having a surface of irregularity identical to those of the  
10 surface of the stimuable phosphor layer.

23. The stimuable phosphor sheet of claim 22,  
wherein the stimuable phosphor layer has a curved, deformed or sloping surface thereon, and the reference  
15 plane-forming guide means having a surface identical to the surface of the stimuable phosphor layer

24. The stimuable phosphor sheet of claim 23,  
wherein the stimuable phosphor layer is produced by a  
20 gas phase deposition method.